

Chapter

One

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Statistical Techniques *in* Business & Economics

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Chapter One

What is Statistics?

GOALS

When you have completed this chapter, you will be able to:

ONE

Understand why we study statistics.

TWO

Explain what is meant by descriptive statistics and inferential statistics.

THREE

Distinguish between a qualitative variable and a quantitative variable.

FOUR

Distinguish between a discrete variable and a continuous variable.

FIVE

Distinguish among the nominal, ordinal, interval, and ratio levels of measurement.

SIX

Define the terms mutually exclusive and exhaustive.

Statistics is the science
of collecting, organizing,
presenting, analyzing,
and interpreting
numerical data to assist
in making more
effective decisions.

 μ Σ β λ σ

What is Meant by Statistics?

Statistical techniques are used extensively by marketing, accounting, quality control, consumers, professional sports people, hospital administrators, educators, politicians, physicians, and many others.

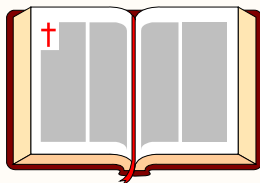


Who Uses Statistics?

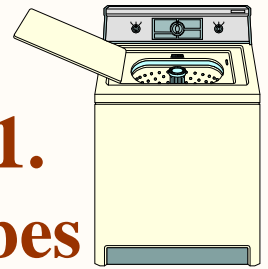
Descriptive Statistics: Methods of organizing, summarizing, and presenting data in an informative way.

EXAMPLE 1: A

Gallup poll found that 49% of the people in a survey knew the name of the first book of the Bible. The statistic 49 describes the number out of every 100 persons who knew the answer.



EXAMPLE 2: According to Consumer Reports, General Electric washing machine owners reported 9 problems per 100 machines during 2001. The statistic 9 describes the number of problems out of every 100 machines.



Types of Statistics

Inferential Statistics: A decision, estimate, prediction, or generalization about a population, based on a sample.

A **Population** is a **Collection** of all possible individuals, objects, or measurements of interest.



A **Sample** is a portion, or part, of the population of interest

Example 1: TV networks constantly monitor the popularity of their programs by hiring Nielsen and other organizations to sample the preferences of TV viewers.



Example 2: Wine tasters sip a few drops of wine to make a decision with respect to all the wine waiting to be released for sale.



Example 3: The accounting department of a large firm will select a sample of the invoices to check for accuracy for all the invoices of the company.

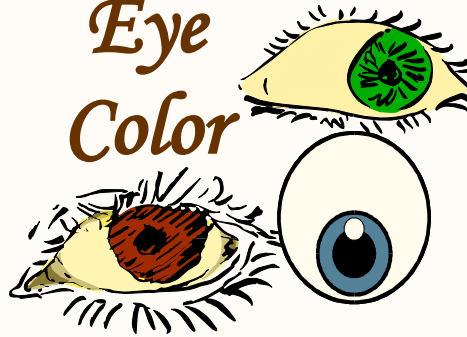
Types of Statistics
(examples of inferential statistics)

For a **Qualitative** or **Attribute Variable** the characteristic being studied is nonnumeric.

Gender



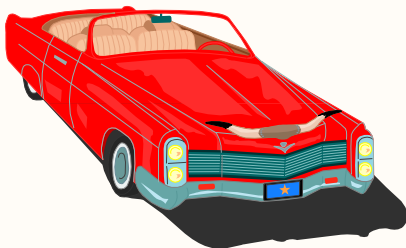
Eye Color



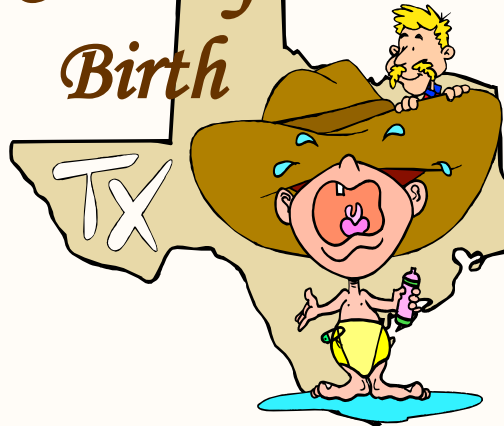
Religious affiliation



Type of car



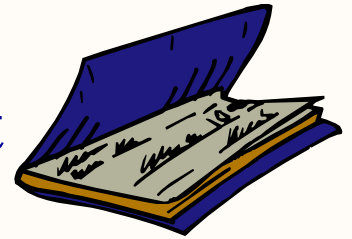
State of Birth



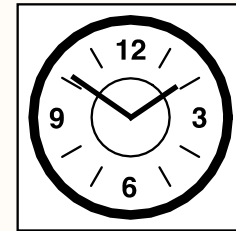
Types of Variables

In a **Quantitative Variable** information is reported numerically.

Balance in your checking account



Minutes remaining in class



Number of children in a family



Types of Variables

Quantitative variables can be classified as either
Discrete or **Continuous**.

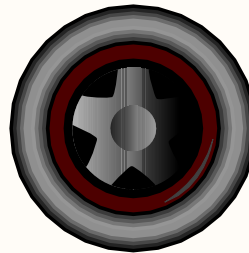
Discrete Variables: can only assume certain values and there are usually “gaps” between values.

Example: the number of bedrooms in a house, or the number of hammers sold at the local Home Depot (1,2,3,...,etc).

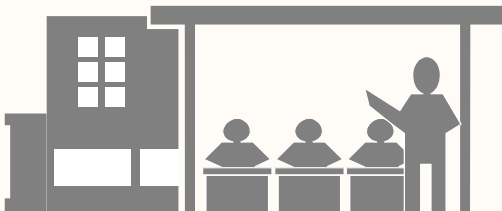


A Continuous Variable can assume any value within a specified range.

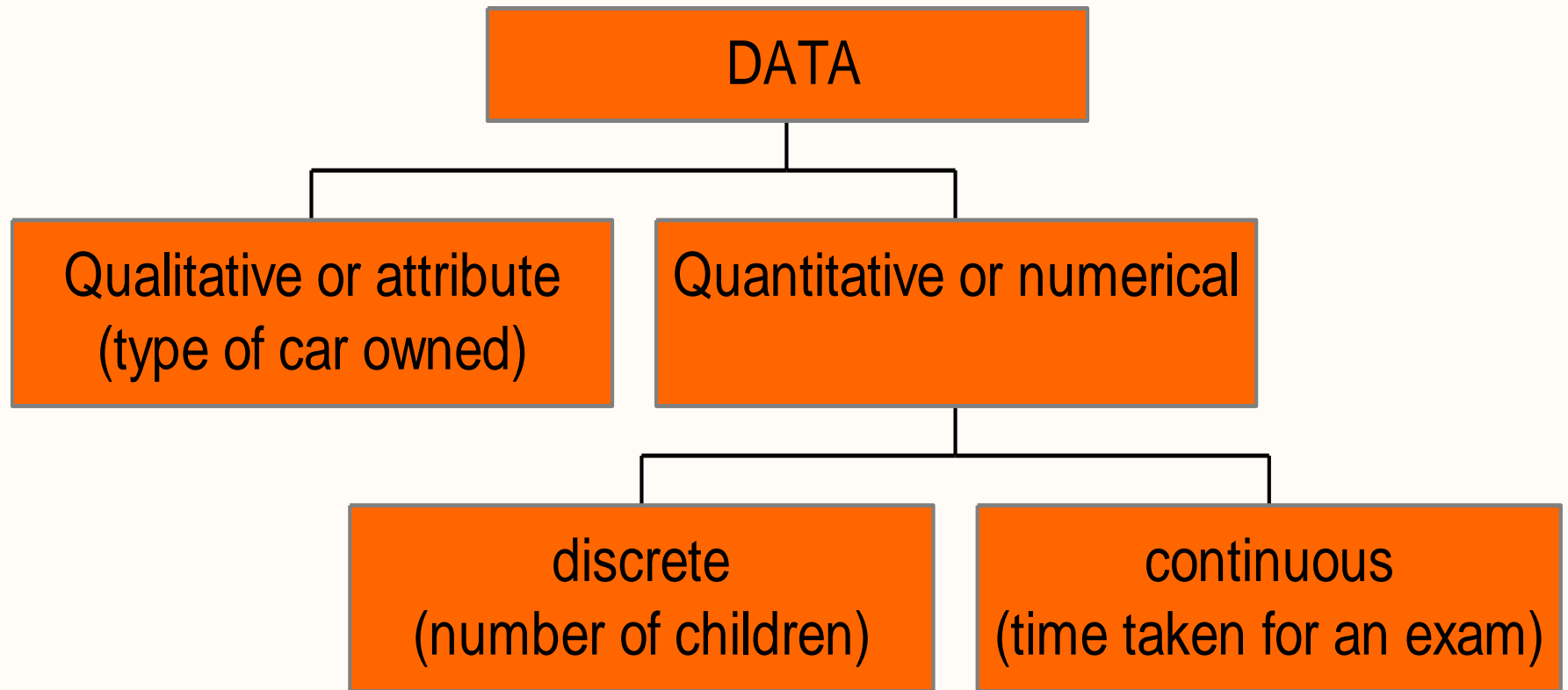
The pressure in a tire



The weight of a pork chop



The height of students in a class.



Summary of Types of Variables

There are four levels of
data

Nominal

Ordinal

Interval

Ratio

Levels of Measurement

Nominal level

Data that is classified into categories and cannot be arranged in any particular order.

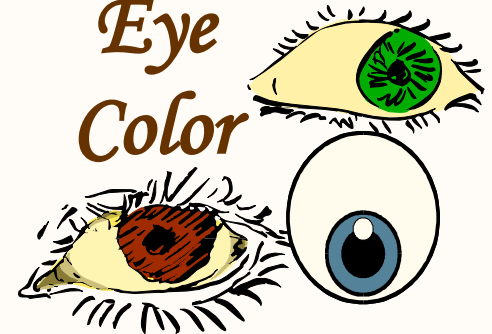
Gender



*Religious
affiliation*



*Eye
Color*



Nominal data

Nominal level variables must be:

Mutually exclusive

An individual, object, or measurement is included in only one category.

Exhaustive

Each individual, object, or measurement must appear in one of the categories.

Ordinal level: involves data arranged in some order, but the differences between data values cannot be determined or are meaningless.

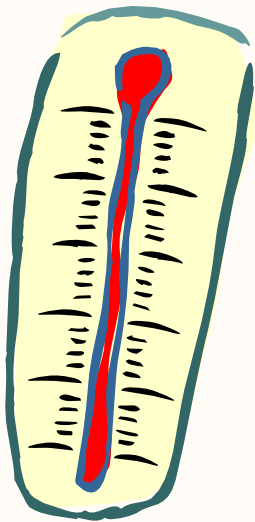
During a taste test of 4 soft drinks, Coca Cola was ranked number 1, Dr. Pepper number 2, Pepsi number 3, and Root Beer number 4.



Levels of Measurement

Interval level

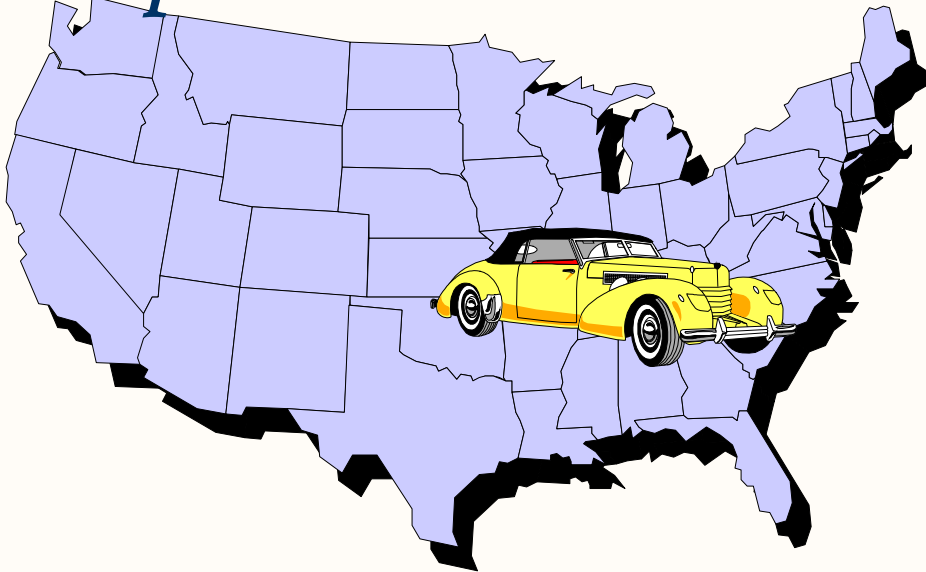
Similar to the ordinal level, with the additional property that meaningful amounts of differences between data values can be determined. There is no natural zero point.



Temperature on the Fahrenheit scale.

Ratio level: the interval level with an inherent zero starting point. Differences and ratios are meaningful for this level of measurement.

Miles traveled by sales representative in a month



Monthly income of surgeons



Levels of Measurement